CUSTOMER CASE STUDY

A well-oiled machine: Cargill uses operations data to mitigate performance loss

Cargill
Industry - Food and Beverage

Challenge

- The production line was losing 40 hours a month in productivity due to microstops

Solution

- Optimize the performance of its oil-filling plant by tracking events in the PI System™

Result

- The production loss was reduced from 20 to 40 hours per month to just eight

Cargill's Global Edible Oil Solutions (GEOS) division fills bottles of olive, vegetable, and other oils for delivery. From raw-material management to filling, capping, and then sending the bottles to the warehouse, the multistep process is complex. Given the volume of the production line, the process must run smoothly every step of the way. Unfortunately, the line experienced microstops, or production breaks of under one minute, at various points in the process, which cost Cargill up to 40 hours per month of productivity. Unable to determine the root cause, Cargill turned to the PI System to analyze and contextualize its operations data to take corrective action.

The four buckets

As a top contributor to production loss, the microstops concerned Cargill. Management needed to identify the underlying reason, but after visually inspecting the line and settings, the team found no anomalies. Line data in the PI System showed production breaks were occurring. However, because all performance-loss data was located in one large bucket, it was difficult to explore further. To understand how often the breaks were happening and isolate the issue, the company needed to take a more granular approach.

Using programmable logic controller information from the filling machine, process engineers created cycle-time tags within the PI System to break the filling process down. Within four new data-collection buckets, engineers analyzed upstream information: raw materials, lag time between fillings, actual fill time. They also noted delay-causing incidents, such as capping failures, which prevents the container from being sent downstream.

As tags accumulated data, information was analyzed in PI ProcessBook and production times emerged. Immediately, engineers could see that fill time was often twice as long as it needed to be, but the information lacked one critical element: the context to understand why.

Context through Asset Framework and Event Frames

Next, the engineer team pulled the tags and cycle times into Asset Framework (AF), the contextualization layer of the PI Server, to organize information hierarchically by asset, location, and more. By defining other attributes, such as temperature, tank level, and pump status, within AF templates, they were able to view line data in an organized manner.

The team used the PI System's Event Frames feature to capture, compare, and analyze important process events. In this way, it defined maximum cycle times for the four production-data buckets. If a cycle exceeded the maximum allotted time, the PI System captured both the event and associated process parameters.

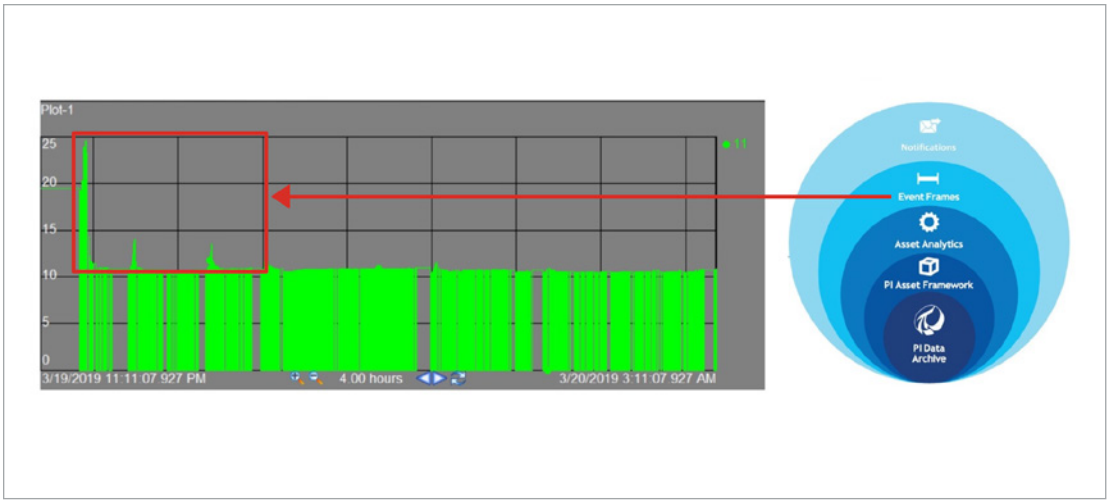
From there, all the information was pushed into PI DataLink so engineers could analyze tags and events directly in Microsoft Excel. Immediately, it was clear that two of the data buckets were driving performance-loss events.

Fill levels and data flow

When digging deeper, the team found that variations occurred during filling, and they noted that occasionally, an uncapped container was sent downstream. Now, the team could see how often these events were occurring. Based on this information, the team inferred that the downstream issue was the capper dropping caps, and a solution was just a maintenance request away. However, they still needed to understand what was triggering the filling issue.

By visualizing information in the PI System, they could see data in a relational way. Data revealed inconsistencies in cycle time: production breaks correlated with the height of the oil in the source tank. As the tank depleted, it was losing head pressure on the pump, extending filling times. Once the set point hit, the tank refilled, and cycle times moved back into range.

> "Once we had information in the PI System, we went from . . . 20, 30, 40 hours of performance loss per month down to eight, so we saw a huge improvement."
>
> -
>
> **Lauren Vahle,**
> Process Optimization Engineer, Cargill



By capturing process-events data, the PI System allowed Cargill to optimize performance of its oil-filling plant.

While tank-level data was previously available and easy to view, it was the context around these levels that highlighted how other factors were impacting the process. Overall, the project took just six to eight hours to set up, and the team asked engineers for just one hour per week for six to eight weeks. In that time, they identified the reason behind the breaks, took action, and reduced production loss from 40 hours down to just eight hours per month. Not only that, mitigating production loss during the week allowed them to reduce overtime shifts over the weekend.

Given the success of the project, more Cargill engineers now receive site-level training to understand the value of the PI System. They also learn how to use it for insights into other processes, such as changeovers, or on other production lines. Through training, they can take brand-new PI System users and teach them how to visualize and analyze information in just two hours. With such a practicable solution, Cargill can now easily replicate the value of the PI System across many of its facilities.

For more information about Cargill and the PI System, watch the full presentation here.